

Amended CLAIMS for PCT / EP 03 / 11337, proposal 14 February 2005

1. Use of an apparatus for the treatment of a material, the apparatus comprising a housing, wherein in the housing a counter rotating intermeshing double extrusion screw is provided, wherein an intermeshing double extrusion screw is defined as an extrusion screw of which two approximately parallel screws have blades such that the thickness of a blade is at least half the distance between two neighbouring blades, wherein the two screws fit closely in the housing such that the material undergoing the treatment has to stay between the blades of the screws, wherein the treatment is processing the material in the housing under pyrolytical conditions.
2. Use of an apparatus according to claim 1, wherein the extrusion screw has a hollow shaft.
3. Use of an apparatus according to claim 2, wherein the blade or blades on the hollow shaft are hollow as well.
4. Use of an apparatus according to any one of claims 1 – 3, wherein the extrusion screw has a double blade over at least part of its length.
5. Use of an apparatus according to any one of the claims 1 – 4, wherein the extrusion screw has a blade with a variable pitch.
6. Use of an apparatus according to any one of claims 1 – 5, wherein the extrusion screw has a blade with sections of alternating short pitch and long pitch.
7. Use of an apparatus according to claim 6, wherein the extrusion screw has a blade having one section having a short pitch, one section having a long pitch, preferably also having an end section having an end pitch.

8. Use of an apparatus according to claim 6 or 7, wherein before each section of the extrusion screw having a blade with a long pitch a kneading element is present between the shaft of the extrusion screw and the housing.
9. Use of an apparatus according to any one of the claims 1 – 8, wherein the housing has one or more outlets for the gasses formed and/or one or more outlets for products formed.
10. Use of an apparatus according to claim 9 in conjunction with claim 6, 7 or 8, wherein for at least each section of the extrusion screw having a blade with a long pitch an outlet for the gasses formed is present in the housing.
11. Use of an apparatus according to any one of claims 1 – 10, wherein the distance between the shaft of the screw and the housing is at least of the same order as the distance between two successive blades, preferably the distance between the shaft and the housing being larger than the distance between two successive blades.
12. Use of an apparatus according to any one of claims 1 – 11, wherein the screw has a shaft on which internals such as paddles and/or rods are provided.
13. Use of an apparatus according to any one of claims 1 – 12, wherein the housing is double walled.
14. Use of an apparatus according to any one of claims 1 – 13, wherein the housing and/or the extrusion screw have been made from cast iron, preferably nodular cast iron.
15. Use of an apparatus according to any one of claims 1 – 14, wherein the housing has a length between 1 and 25 metres, preferably between 8 and 15 metres, more preferably approximately 12 metres.

16. Use of an apparatus according to any of the preceding claims, wherein the material is coal and the treatment is directed at making char.
17. Use of an apparatus according to any of the preceding claims wherein the treatment of the coal under pyrolytical conditions takes place in three phases, a heating phase of the material, a reaction phase in which the material may become at least partially plastic and a third phase in which one or more processed products are formed, wherein the processed products are formed in the housing while the material and the products in the housing are transported by means of the counter rotating intermeshing double extrusion screw.
18. Use of an apparatus according to claim 17, wherein the extrusion screw is self-cleaning during the transport of the material and the processed products.
19. Use of an apparatus according to claims 17 or 18, wherein the material and the processed products are kneaded during transport.
20. Use of an apparatus according to any of the preceding claims, wherein the extrusion screw rotates with a velocity of at most 25 rounds per minute, preferably at a velocity of approximately 1 round per minute.
21. Use of an apparatus according to any of the preceding claims 17 to 20, wherein the material and the processed products are heated to a maximum temperature of 300° C to 1000° C, preferably to a temperature of 400° C to 700° C, more preferably to a temperature of approximately 600° C.
22. Use of an apparatus according to any one of claims 17 - 21, wherein the transporting time of the material and the processed products in the housing is between 10 and 60 minutes.

23. Use of an apparatus according to any one of claims 17 to 22, wherein the material and the processed products are treated under a pressure of 0,5 to 5 bar in the solid/liquid/gas phase.
24. Use of an apparatus according to any one of claims 1 to 15, wherein the material is iron ore or metal oxide and the treatment is making steel or metal in the presence of a reducing agent.
25. Use of an apparatus according to any one of claims 1 to 15, wherein the material is tar and/or oil and the treatment is making petrol, diesel fuel and/or other chemicals.
26. Use of an apparatus according to any one of claims 1 to 15, wherein the material is biomass, tyres or waste and the treatment is making oil and gas.